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orably associated. Fortunately her work as an entomologist is not to be interrupted, and she will continue to place her knowledge at the service of agriculturists."

The newspapers report that a large manufacturing building at Springfield, Illinois, has been riddled by an insect borer, apparently a small beetle.

MICROSCOPY.¹

A New Method of Using Celloidin for Serial Section Cutting.—The following has several features which recommend it as preferable to the ordinary methods of section cutting.—It allows a perfect orientation; the entire object is visible during the process of cutting; yolk-bearing eggs offer no serious difficulty; sections of large area and of unusual thinness are easily secured; crimping and curling during the process of clearing are avoided and the sections may be readily arranged in series.

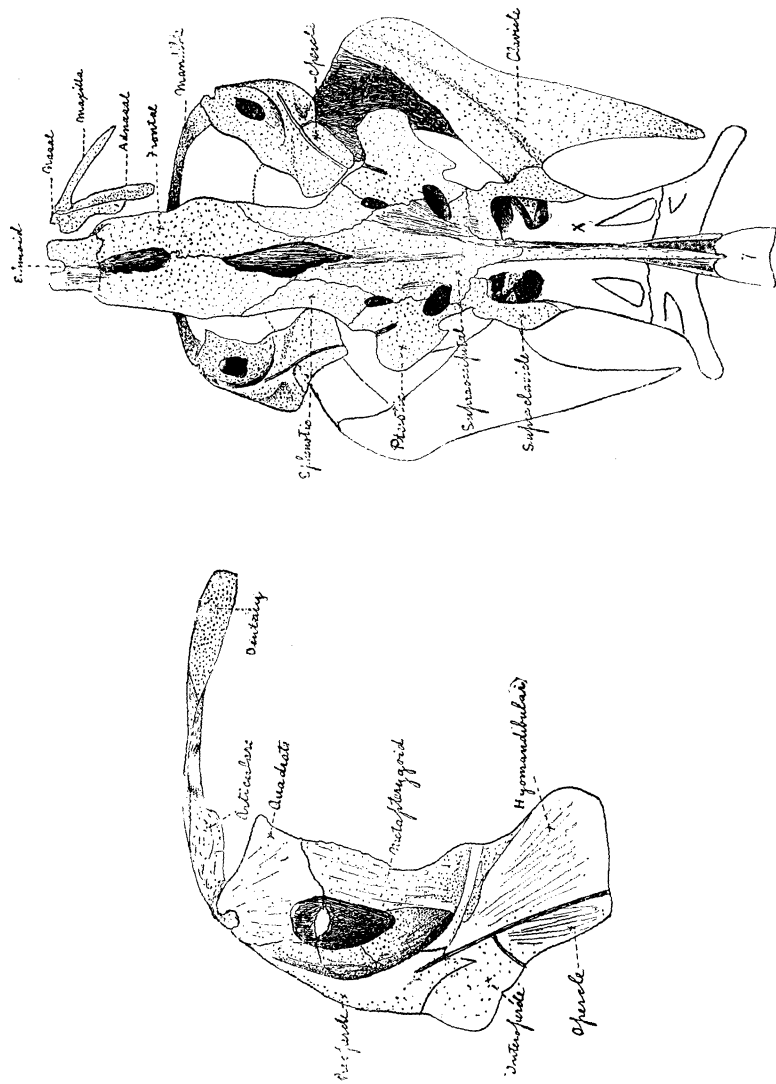
The object is first stained *in toto*, dehydrated, infiltrated with thin, medium and thick celloidin or collodion, (Squibbs Flexible Collodion rendered thick by evaporation is excellent) and finally placed in a paper tray filled with the thick collodion. In a few moments a film will form over the exposed surface of the collodion, when the paper tray with its contents is thrown into a jar of strong chloroform, in which after a few hours, the collodion becomes quite hard. Thus far we have been following only the more ordinary methods.

The tray is now taken from the chloroform and, after the paper has been removed from the hardened block, the collodion with its enclosed object is placed in a vial of white oil of thyme, or some other similar oil. If the block of collodion is not large, in a few hours it will become as clear as glass, the stained object appearing as if suspended in a transparent fluid.

For the process of orienting, the block of collodion may now be taken from the oil, placed in a watch crystal and, after covering with the oil of thyme, examined with a lens or, if more desirable, with a compound microscope. The side of the block that is to be attached to the object holder of the minotome is now selected, wiped dry of the oil and immersed for a moment in ether and then smeared with thick collodion. The object holder, a block of wood rather than cork, is

¹Edited by C. O. Whitman, Clark University, Worcester, Mass.

PLATE VI.



Skull of *Aspredo*.

smearcd in the same way and the two collodionized surfaces are brought together. The holder and collodion block are now immersed for a few minutes in chloroform, or long enough for them to become firmly united.

The preparation is now screwed between the jaws of the object-carrier of the minotome and covered, by means of a camel's hair brush, with oil of thyme. The minotome knife is flooded with the same oil. The oil, which thus takes the place of alcohol usually used, has the advantage because of its lubricating property, of not only permitting thin sections to be cut, but its slow evaporation allows one to leave his work at anytime for minutes or even hours without the object being injured.

After a few sections have been cut from the block of collodion, the relative position of the plane of the knife to the axis of the object can be definitely established. I have had no difficulty in orienting small Arthropod embryos by simply examining the object and plane of cutting at this time with a compound microscope. The segments, appendages and even nuclei being as clearly shown as if mounted in balsam.

The object, satisfactorily oriented, is now cut and the sections at once transferred to the slides, covered with balsam and mounted, or, if they are not immediately needed, they may be kept indefinitely in a vial of the oil.

If the sections are to be arranged 'in series,' they are simply placed upon a slide one after the other, care being taken not to flood the slide with oil but to keep it quite dry. After the sections are arranged, the slide is tilted up to allow the excess of oil to drain away, fifteen minutes generally being sufficient. Balsam is now placed on the sections and a warm cover is allowed to gently fall over the series, no section of which ought to leave its place.

The above method is especially useful in the preparation of larger yolk-bearing eggs.—H. C. BUMPUS, *Brown University, Prov., R. I., Dec., 14, 1891.*

Imbedding Blastoderm of Chick in Collodion.¹—For sectioning, blastoderms should be dehydrated, either before or after staining, as is thought best, and immediately transferred to a thin solution of collodion² (2 per cent.,) after which they are placed in a

¹Gage & Hopkins, *Proc. Am. Soc. Microscopist*, 1890, p. 129.

²We have found collodion more satisfactory, on the whole than celloidin and it is less costly.

To make a two per cent. solution, dissolve 2 grams of gun-cotton in 100 c. c. of sulphuric ether and 95 per cent. alcohol, equal parts of each. For a 5 per cent. solution use 5 grams of gun-cotton instead of 2.

thick solution of collodion (5 per cent.) and then arranged for imbedding and sectioning. To accomplish this, the following procedure has been found useful:

With a camel's hair brush transfer the blastoderm from 95 per cent. alcohol to a paper box. It is better to fill this box partly full of alcohol (95 per cent.) before transferring the blastoderm to it, as the alcohol partially floats the blastoderm and thus facilitates its removal from the brush. As soon as the blastoderm is safely in the box, remove the alcohol with a dropper (do not try to pour it off, otherwise the blastoderm will curl up) and carefully pour in enough thin

collodion to cover the blastoderm to the depth of about $\frac{1}{2}$ c.m. The box is now placed in a tightly covered jar to prevent too rapid evaporation and the consequent solidification of the collodion.

After the blastoderm has remained a sufficient length of time (from one to three or more hours, depending on the size of the blastoderm) in the thin solution, the collodion is removed with a dropper, and the thick solution poured on. After infiltrating sufficiently with thick collodion, 2 to 10 hours, open the jar and allow a film to form on the surface of the collodion, then fill the paper box with alcohol (60 to 80 per cent.) and allow it to remain until the collodion becomes firm and tough; two to four hours is usually sufficient. Now with a sharp knife a square or rectangular piece of collodion including the blastoderm is cut out and arranged on the cork in any position desired; the block is fastened to the cork, as any ordinary tissue, by simply pouring over it thick collodion, which is hardened

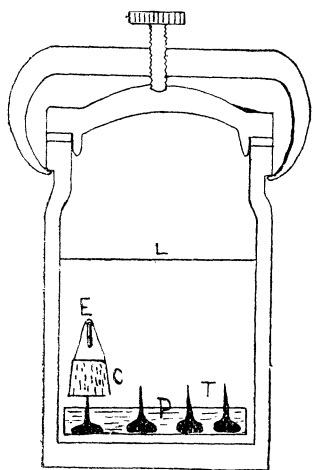


FIG. 1. Jar for hardening the collodion, of collodion-imbedded objects.

(P) Plaster of Paris disc, in which are imbedded the glass tacks. The cork (C), on which the embryo (E) is imbedded, is pushed down upon a glass tack (T), and is held in position under the liquid (L), alcohol or chloroform, while the collodion is hardening.

by immersing in alcohol (60 to 80 per cent.) for from 5 to 15 hours.

For holding the corks under the alcohol the following apparatus has been found more economical and convenient than the method of

attaching weights to the corks. The apparatus consists simply of a

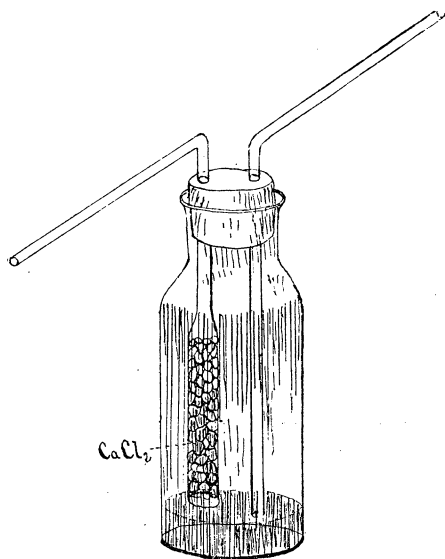


FIG. II. Ether wash-bottle for blowing ether vapor upon collodion or celloidin sections to fasten them to the slide. The tube of calcium chloride (Ca Cl_2) is for dehydrating the ether vapor.

layer $1\frac{1}{2}$ to 2 c.m. deep. When this hardens, the tacks are firmly held in an upright position, and all that remains to be done is to place the plaster disc in the bottom of the glass jar.

To use the apparatus, fill it partly full of alcohol (60 to 80 per cent.). As the specimens are imbedded on the corks, transfer them to this jar, sticking each cork upon a tack.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

The American Society of Naturalists—Met in Philadelphia, December 29th and 30th, 1891. They discussed a salient point in evolution on the morning of the 30th, and in the afternoon listened to the descriptions of three important expeditions which went out in 1891. The morning session was given up to the reading of four papers on "Definite vs. Fortuitous Variation in Animals and Plants." Professor Thomas Meehan, Professor J. P. McMurrich, Professor J. A. Allen and